

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims:

1 1. (Original) A method of determining if a link is alive, comprising:
2 establishing a secure link between a first node and a second node
3 according to a security protocol;
4 sending at least one ping message targeting the second node over the
5 secure link, the at least one ping message defined outside the security protocol; and
6 monitoring for at least one ping reply to determine if the secure link is
7 alive.

1 2. (Original) The method of claim 1, wherein establishing the secure link
2 comprises establishing a virtual private network session.

1 3. (Original) The method of claim 1, wherein establishing the secure link
2 comprises establishing a link protected by an Internet Protocol Security protocol.

1 4. (Original) The method of claim 3, wherein sending the at least one ping
2 message comprises sending at least one Internet Control Message Protocol message.

1 5. (Original) The method of claim 1, wherein sending the at least one ping
2 message comprises sending at least one Internet Control Message Protocol message.

1 6. (Original) The method of claim 1, wherein establishing the secure link
2 comprises establishing the secure link between first and second nodes each comprising a
3 security gateway.

1 7. (Original) The method of claim 6, further comprising sending at least one
2 ping message targeting another node behind the second node.

1 8. (Currently Amended) The method of claim 7, further comprising
2 monitoring for at least one ping reply ~~form~~ from the other node.

1 9. (Original) The method of claim 1, further comprising tearing down the
2 secure link if the secure link is determined not to be alive.

1 10. (Original) The method of claim 9, wherein tearing down the secure link
2 comprises tearing down a security association according to an Internet Protocol Security
3 protocol.

1 11. (Original) A method of communicating with a remote node, comprising:
2 establishing a secure link between a first security gateway and a second
3 security gateway, the remote node in communication with the second security gateway;
4 sending at least one ping message to the remote node over the secure link
5 and through the second security gateway; and
6 monitoring for at least one ping reply from the remote node to determine if
7 the secure link is alive.

1 12. (Original) The method of claim 11, wherein establishing the secure link
2 comprises establishing a secure link protected according to an Internet Protocol Security
3 protocol.

1 13. (Original) The method of claim 11, wherein establishing the secure link
2 comprises establishing a virtual private network session.

1 14. (Original) The method of claim 11, wherein establishing the secure link
2 comprises establishing a secure link protected according to a security protocol.

1 15. (Original) The method of claim 14, wherein sending the at least one ping
2 message comprises sending at least one ping message defined outside the security
3 protocol.

1 16. (Original) The method of claim 15, wherein sending the at least one ping
2 message comprises sending an Internet Control Message Protocol message.

1 17. (Original) The method of claim 16, wherein establishing the secure link
2 comprises establishing a secure link protected according to an Internet Protocol Security
3 protocol.

1 18. (Original) A system for communicating between a network element and a
2 remote node, comprising:
3 a security module adapted to establish a secure link with the remote node,
4 the secure link having a security mechanism according to a security protocol; and
5 a keep-alive module adapted to send at least one ping message over the
6 secure link to the remote node, the at least one ping message defined outside the security
7 protocol.

1 19. (Original) The system of claim 18, wherein the security protocol
2 comprises an Internet Protocol Security protocol.

1 20. (Original) The system of claim 18, wherein the at least one ping message
2 comprises an Internet Control Message Protocol message.

1 21. (Original) The system of claim 18, further comprising:
2 an interface to a packet-based network, the secure link established over the
3 packet-based network; and
4 a layer to control communications over the packet-based network.

1 22. (Original) The system of claim 21, wherein the layer comprises an Internet
2 Protocol layer.

1 23. (Original) The system of claim 18, wherein the keep-alive module is
2 adapted to further monitor for at least one ping reply responsive to the at least one ping
3 message to determine if the secure link is alive.

1 24. (Original) The system of claim 23, wherein the security module is adapted
2 to tear down a security association of the secure link if the secure link is not alive.

1 25. (Original) The system of claim 24, wherein the security association
2 comprises an Internet Protocol Security protocol security association.

1 26. (Original) The system of claim 18, wherein the keep-alive module is
2 adapted to further monitor for at least one ping reply responsive to the at least one ping
3 message to determine if the secure link is alive, the system further comprising a module
4 adapted to establish a link over a secondary communication network if the secure link is
5 not alive.

1 27. (Original) An article comprising at least one storage medium containing
2 instructions for controlling communications, the instructions when executed causing a
3 controller to:
4 establish a secure link between a first node and a second node according to
5 a security protocol;
6 send at least one ping message targeting the second node over the secure
7 link, the at least one ping message defined outside the security protocol; and
8 monitor for at least one ping reply to determine if the secure link is alive.

1 28. (Original) The article of claim 27, wherein the instructions when executed
2 cause the controller to further establish an Internet Protocol security association for the
3 secure link.

1 29. (Original) The article of claim 28, wherein the instructions when executed
2 cause the controller to tear down the security association if the controller does not receive
3 the at least one ping reply.

1 30. (Original) The article of claim 27, wherein the controller is part of the first
2 node.

1 31. (Currently Amended) A data signal embodied in a carrier wave and
2 containing instructions for controlling communications, the instructions when executed
3 causing a system to:

4 establish a secure link between a first security gateway and a second
5 security gateway;

6 send at least one ping message to a remote node over the secure link and
7 through the second security gateway; and

8 monitor for at least one ping reply from the remote node to determine if
9 the secure link is alive.

1 32. (New) The method of claim 1, wherein sending the at least one ping
2 message comprises sending the at least one ping message protected according to the
3 security protocol.

1 33. (New) The method of claim 1, wherein the security protocol comprises an
2 Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping
3 message comprises sending the at least one ping message encrypted according to an IPsec
4 security association.

1 34. (New) The method of claim 15, wherein sending the at least one ping
2 message comprises sending the at least one ping message protected according to the
3 security protocol.

1 35. (New) The method of claim 15, wherein the security protocol comprises
2 an Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping
3 message comprises sending the at least one ping message encrypted according to an IPsec
4 security association.

1 36. (New) The system of claim 18, wherein the at least one ping message is
2 protected according to the security protocol.

1 37. (New) The system of claim 18, wherein the security protocol comprises an
2 Internet Protocol Security protocol (IPsec), and wherein the at least one ping message is
3 encrypted according to an IPsec security association.

1 38. (New) The article of claim 27, wherein sending the at least one ping
2 message comprises sending the at least one ping message protected according to the
3 security protocol.

1 39. (New) The article of claim 27, wherein the security protocol comprises an
2 Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping
3 message comprises sending the at least one ping message encrypted according to an IPsec
4 security association.